CLAIMS

1. A highlight suppression image pickup apparatus comprising:

a camera part which acquires a desired image;

a highlight suppression signal producing part which produces a highlight suppression signal on the basis of an image output from one color channel or at least one of two or more color channels output from the camera part; and

an active filter part which is disposed in the vicinity of a focal plane of the camera part and which optically controls, in accordance with the highlight suppression signal, the amount of light transmitted to an imaging plane of each of the color channels,

characterized in that the image acquired in the camera part is output, via the active filter part, as a highlight-suppressed image in which highlight is optically suppressed.

2. The highlight suppression image pickup apparatus according to claim 1, wherein the active filter part optically controls the amount of light transmitted to each portion of the imaging plane of each color channel in predetermined pixel units or predetermined image area units in accordance with the highlight suppression signal.

3. The highlight suppression image pickup apparatus according to claim 1 or 2, wherein the active filter part is provided in the vicinity of the imaging

plane of the camera part.

4. The highlight suppression image pickup apparatus according to claims 1 to 3, wherein the camera part comprises a focal plane within a lens optical system which is different from the focal plane of the imaging plane, and

the active filter part is provided in the vicinity of the focal plane within the lens optical system.

5. The highlight suppression image pickup apparatus according to claims 1 to 4, wherein the camera part comprises: an image acquiring channel part which acquires a desired image; and a dedicated channel part which acquires an image used to produce a highlight suppression signal and which is different from the image acquiring channel part, and

the highlight suppression signal producing part produces, on the basis of an image output acquired in the dedicated channel part, a highlight suppression signal corresponding to the image obtained in the image acquiring channel part.

6. The highlight suppression image pickup apparatus according to claims 1 to 5, comprising an electronic control part which electronically suppresses the image output from the camera part on the basis of the highlight suppression signal,

wherein the image output acquired in the camera part is optically highlight-suppressed via the active

filter, and output as a highlight-suppressed image in which the highlight is electronically suppressed.

7. The highlight suppression image pickup apparatus according to claims 1 to 6, wherein the highlight suppression signal producing part produces a non-binary highlight suppression signal which indicates gradation, and

the image output acquired in the camera part is output as a highlight-suppressed image in which the highlight suppression is gradationally given by the non-binary highlight suppression signal via the active filter part intensely on a highlight side and weakly on a lowlight side.

8. The highlight suppression image pickup apparatus according to claim 7, comprising a restore signal producing part which produces a restore signal on the basis of the non-binary highlight suppression signal which indicates the gradation,

wherein the highlight-suppressed image in which the highlight suppression is gradationally given via the active filter part is restored to the gradation of the original image and then output.

9. The highlight suppression image pickup apparatus according to claims 1 to 8, wherein the camera part comprises: an infrared imaging element having sensitivity to infrared rays on a long-wavelength side; an optical filter which cuts visible light sensitivity of the infrared imaging element; and a visible light imaging

element having sensitivity to visible light,

wherein the highlight suppression signal producing part produces a highlight suppression signal on the basis of the image output of visible light output from the camera part, and

the image output acquired in the camera part is output as a highlight-suppressed infrared image via the active filter part whose infrared image transmission characteristics are controlled by the highlight suppression signal based on a visible light image.

10. The highlight suppression image pickup apparatus according to claims 1 to 9, wherein the active filter part is provided as a composite element integrated with the imaging element of the camera part.

11. The highlight suppression image pickup apparatus according to claims 1 to 10, wherein the active filter part has a multilayer structure in which elements for control of the amount of transmitted light are arranged on a plurality of stages.

12. The highlight suppression image pickup apparatus according to claims 1 to 11, wherein the active filter part comprises an element which controls the amount of transmitted light in accordance with the intensity of incident light instead of the electronic control.

13. The highlight suppression image pickup apparatus according to claims 1 to 12, wherein the active

filter part controls the transmission time of transmitted light to control the amount of light transmitted to the imaging plane of each color channel.

14. The highlight suppression image pickup apparatus according to claims 1 to 13, wherein the imaging element provided on the imaging plane of each color channel controls charge storage time in predetermined pixel units or predetermined image area units to control the sensitivity of the imaging plane.

15. The highlight suppression image pickup apparatus according to claims 1 to 14, wherein the highlight suppression signal producing parts are provided in the respective color channels,

highlight-suppressed images are produced in the respective color channels, and

the produced highlight-suppressed images are synthesized to be output as a final highlight-suppressed image.

16. The highlight suppression image pickup apparatus according to claims 1 to 14, wherein the output of the highlight-suppressed image produced on the basis of the highlight suppression signal is suppressed to a predetermined reference value, and an image signal produced from a signal indicating the amount of this suppression is output as a highlight-suppressed image.

17. The highlight suppression image pickup

apparatus according to claim 16, wherein for a highlight portion in the highlight-suppressed image produced on the basis of the highlight suppression signal, an image signal is produced from the signal indicating the amount of suppression performed to the predetermined reference value, and for a lowlight portion therein, an image signal based on the highlight suppression signal is produced, and these image signals are then synthesized to be output as a final highlight-suppressed image.